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BEFORE THE BOARD OF PATENT APPEALS

AND INTERFERENCES

Paper No. 19

Application Number: 09/229,628

Filing Date: 01/13/1999

Appellant(s): Sakaino et al.

Jeffri A. Kaminski

For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 03/08/02.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The brief states that there are no related appeals or interferences.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 3-5 stand or fall together, and claims 16-21 stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

US 5,844,281	Narita	01 Dec 1998
JP 6-232345	Ando	19 Aug 1994

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1-5 and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando (JP. 6-232345 A) in view of Narita (US. 5,844,281).

With respect to claims 1, 3-5, and 16-17, Ando discloses in abstract and Figs. 1(a) and 1(b) a semiconductor integrated circuit device, comprising: impurity diffusion regions 103 formed as source and drain on a semiconductor substrate; a first conductive layer and a third conductive layer 104 having a first resistivity formed on the source/drain impurity diffusions 103; a first contact hole group and a third contact hole group 106 connecting the first conductive layer and the third conductive layer 104 to the source/drain impurity diffusion regions 103, respectively; a second conductive layer and a fourth conductive layer 102 having a second resistivity formed on the first conductive layer and the third conductive layer 104, respectively; a second contact hole group and a fourth contact hole group 105 connecting the first conductive layer and the third conductive layer 104 to the second conductive layer and the fourth conductive layer 102, respectively, at an upper part of the source/drain impurity diffusion regions 103, wherein the first

conductive layer and the third conductive layer 104 are made of a high-resistance material (see abstract), and wherein the total number of contacts in the first contact hole group 106 is the same as the total number of contact holes in the third contact hole group, and the total number of contact holes in the second contact hole group 105 is the same as the total number of contact holes in the fourth contact group.

Ando does not specifically disclose that a total number of holes in the first contact hole group 106 is more (or twice) than a total number of holes in the second contact hole group 105 and a total number of holes in the third contact hole group 106 is more (or twice) than a total number of holes in the fourth contact hole group 105.

However, Narita ('281) teaches in Fig. 2 the obviousness of forming a first conductive layer 11 made of polysilicon (column 5, lines 35-40) and having resistivity higher than resistivity of second conductive layer 3 made of aluminum (column 5, lines 21-22), and the forming of a total number of holes in the first contact hole group 72 being different or more than a total number of holes in the second contact hole group 71.

Given the above teachings, it would have been obvious to one of ordinary skill in the art to modify the device structure of Ando by forming a total number of holes in the first and third contact hole groups being more (or twice) than a total number of holes in the second and fourth contact hole groups for the purpose of preventing the breakdown of diffusion layer by limiting the current flowing through the total number of holes in the first and third contact hole groups, such as taught by Narita (column 5, lines 31-35).

With respect to claim 2, Ando discloses the first conductive layer 104 made of a high resistance material (see abstract), but Ando does not disclose the material of the first conductive layer 104 having resistivity higher than the resistivity of the material of the second conductive layer 102. However, as discussed above, Narita ('281) teaches in Fig. 2 the obviousness of forming a first conductive layer 11 made

of polysilicon (column 5, lines 35-40) and a second conductive layer 3 made of aluminum (column 5, lines 21-22). And as is well known, polysilicon has a resistivity higher than the resistivity of aluminum. Accordingly, it would have been obvious to one of ordinary skill in the art to form the first conductive layer of Ando having the resistivity higher than the resistivity of the second conductive layer, in view of teaching of Narita, because the higher resistivity of the first conductive layer would also contribute to the benefits of preventing the breakdown of diffusion layer by limiting the current flowing through the high resistivity first conductive layer, such as taught by Narita (column 5, lines 31-35).

With respect to claims 18-21, Ando, in Figs. 1(a) and 1(b), further discloses that the second and fourth contacts 105 are located over end portions of source/drain regions 103 and the first and third contact holes 106 are located over a central portion of the source/drain regions, wherein a distance from an end of the source/drain region 103 to a nearest one of the first contact or third contact 106 is greater than a distance from the gate electrode to the nearest one of the first contact or third contact 106.

(11) Response to Argument

A) Appellant (page 8 of brief) argues that the combination of Narita with Ando results no change in the number of first contacts comparing to the number of second contacts on the source region because both Ando and Narita disclose an arrangement of first and second contacts in alternating fashion.

The arguments are not persuasive because Appellants have presented no evidence on this record to support their position that there must be no change in the number of first contacts comparing to number of the second contacts on the source region because both Ando and Narita disclose an arrangement of first and second contacts in alternating fashion. Appellants are noted that an assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a

prima facie case of obviousness. *In re Schulze*, 346 F. 2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). In contrast, Appellants' assertion is incorrect. Evidently, Fig. 2 of Narita clearly shows the change (or different) in the number of first contacts 72 comparing to number of second contacts 71 even though the first and second contacts are arranged in alternating fashion.

B) Appellants (pages 8-9 of brief) further argues that the combination of Ando and Narita does not result in a semiconductor device having the number of first and third contacts being different or more from the number of second and fourth contacts as recited in claim 3 because Narita teaches the use of two-level wiring over the source region, but not the drain region.

Appellants should be noted that the rejections of claims 3 and 16 are not based on anticipation, but rather, are based on obviousness. Therefore, these arguments have no immediate apparent relevance to the issues presented by the rejection since Appellants cannot show nonobviousness by attacking references individually where the rejection is based upon a combination of references. *In re Young*, 403 F. 2d 754, 757, 159 USPQ 725, 728 (CCPA 1968). The Examiner relies on the combined teachings at Ando and Narita. Narita is not relied on for teaching the forming of two-level wiring over both the source/drain regions. Ando discloses the forming of two-level wiring over both the source/drain regions. Narita is relied on for showing that it was known to form the number of first contacts in the first level wiring group being different or more than the number of second contacts in the second level wiring group on the source region for preventing the break down of source region by limiting the current flowing through the number of first contacts in the first level wiring group. The Examiner thus regards the Appellants' assertions as constituting evidence that the Appellants have failed to consider as a whole the prior art teachings disclosed by the combining of the references.

Furthermore, Appellants should also be noted that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, based on the teachings of Narita, the artisan would be motivated to modify Ando's device by forming the number of first contacts being different or more from the number of second contacts on the source region and the number of third contacts being different or more from the number of fourth contacts on the drain region. Such modification would have been obvious because Narita clearly teaches the motivation of preventing the breakdown of diffusion region (i.e., source and drain regions) by limiting the current flowing through the high number of contacts in the first level wiring group (column 5, lines 31-35).

With respect to claim 16, as discussed in details above, because Narita (Fig. 2) clearly suggests the forming of the number of first contacts 72 being **more** than the number of second contacts 71 for preventing the breakdown of diffusion region (i.e., source and drain regions) by limiting the current flowing through the high number of first contacts 72, the artisan would be motivated to form the number of first contacts to the number of second contacts in a ratio as claimed depending upon the desired overall resistance and current. Such changing would have been obvious because it has been held that changing in ratio/proportion of the

essential working parts of a device involves only routine skill in the art. *In re Rose*, 220 F. 2d 459, 105 USPQ 237 (CCPA 1955). Furthermore, it appears that the changing in the ratio of the number of first contacts to the number of second contacts would produce the same results of limiting the current flowing through the high number of first contacts. Therefore, this change produces no functional different and it would have been obvious. See *In re Woodruff*, 919 F. 2d 1575, 1578, 16 USPQ 2d 1934, 1936 (fed. Cir. 1990).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

PC
December 6, 2001

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